

The opinion in support of the decision being entered today  
is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* JUNICHIRO SUZUKI, KAZUTAKA,  
and HIROAKI ITO

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Appeal 2007-2023  
Application 10/757,453  
Technology Center 1700

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Decided: July 26, 2007

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Before CHUNG K. PAK, CHARLES F. WARREN, and  
LINDA M. GAUDETTE, *Administrative Patent Judges*.

GAUDETTE, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal from the Examiner's final rejection of claims 1-8.<sup>1</sup>  
We have jurisdiction over the appeal pursuant to 35 U.S.C. § 6(b).  
We affirm.

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<sup>1</sup> An oral hearing took place on July 11, 2007.

Independent Claim 1 is illustrative of the invention and is reproduced below:

1. An automotive fuel hose, which comprises: a tubular inner layer which is adapted for the flow of fuel, the inner layer comprising a fluoro-resin having a functional group; a low fuel permeability layer provided about an outer peripheral surface of the inner layer comprising a polyester resin having a naphthalene ring; and an adhesive layer for bonding the inner layer and the low fuel permeability layer comprising a blend of polyamide resin and polyester resin.

The Examiner relies on the following prior art references to show unpatentability:

Nishino	US 6,089,278	Jul. 18, 2000
Nishi	US 2002/0104575 A1	Aug. 8, 2002

The Examiner made the following rejection:

Claims 1-8 under 35 U.S.C. § 103 as obvious over Nishino in view of Nishi.

## ISSUE

The Examiner contends that it would have been obvious to modify Nishino's multi-layer fuel hose based on Nishi's disclosure of improved adhesion in a two-layer fuel hose, thereby achieving the claimed invention. Appellants contend that Nishi and Nishino teach mutually exclusive solutions to the problem of interlaminar adhesion in fuel hoses and, therefore, the Examiner's motivation to combine the references can only be based on improper hindsight reasoning. The issue for us to decide is: Has the Examiner properly established motivation to combine the references within the meaning of 35 U.S.C. § 103?

For the reasons discussed below, we answer this question in the affirmative.

#### RELEVANT FINDINGS OF FACT

- 1) Nishino discloses an automotive fuel hose (col. 1, ll. 8-10) comprising an innermost layer 10, an adhesive layer 11, a middle layer 12, an adhesive layer 13, and an outer layer 14 (col. 4, ll. 11-13).
- 2) Nishino uses fluorine type resins and polyamide type resins for the innermost layer 10 (col. 5, ll. 48-49). According to Nishino, polyvinylidene fluoride resin (PVDF) and ethylene-tetrafluoroethylene copolymer resin (ETFE) are “especially preferable in view of their molding facility and adhesion to other resins” (col. 6, ll. 13-15).
- 3) According to Nishino, the middle layer 12 is made from polyalkylene naphthalate resins (col. 7, ll. 26-27).
- 4) Nishino states that “[t]he polyalkylene naphthalate resin may, if necessary, melt-include other resins, elastomer components, or compounds having a functional group for improving the adhesion to the other layers” (col. 8, ll. 17-20).
- 5) Nishino teaches that where the innermost layer 10 is a fluorine type resin and the middle layer 12 is a polyalkylene naphthalate resin, the adhesive layer 11 preferably includes a fluorine type resin and at least one of a crystalline polyester type resin and polyester type elastomer (col. 9, ll. 27-37).

- 6) Nishino discloses that the adhesive layer 11 may be a polyamide type resin and at least one of a crystalline polyester type resin and polyester type elastomer (col. 9, ll. 58-61).
- 7) According to Nishi, inadequate bond strength is a known problem in the manufacture of two-layer fuel hoses comprising a fluororesin inner layer and adjacent polyamide outer layer. Nishi states that this problem is the result of the low adhesive property of the fluororesin (§ [0006]).
- 8) According to Nishi, a known solution to the problem of interlaminar adhesion is to interpose a layer of an adhesive between the inner layer of fluororesin and the outer layer of polyamide resin, thereby forming a three-layer structure (§ [0007]).
- 9) According to Nishi, a drawback of the three-layer structure is that additional processing steps are required (e.g., surface treating the fluororesin and laminating the adhesive) which leads to higher costs (§ [0008]).
- 10) An object of Nishi's invention is "to provide a fuel hose which has a double layer structure excellent in interlaminar adhesion without using an adhesive" (§ [0010]).
- 11) Nishi's invention is directed to a fuel hose having a two-layer structure comprising an inner layer made of a fluororesin and an outer layer adjacent thereto made of a thermoplastic resin other than a fluororesin (§ [0011]).
- 12) Nishi states that the inventive fuel hose "is excellent in interlaminar adhesive force without using an adhesive and further

has a sufficient strength as a hose and a sufficient antistatic function” (¶ [0131]).

- 13) Nishi discloses that a preferred fluoro-resin for use as the inner layer is ETFE (¶ [0018]).
- 14) Nishi discloses that the thermoplastic resin of the outer layer may be a polyamide, a polyester, or a blend thereof (¶ [0015]).
- 15) Nishi further discloses that the fluoro-resin of the inner layer has the feature of melt adhesiveness with the thermoplastic resin of the outer layer (¶ [0021]).
- 16) According to Nishi, this feature may be achieved by the addition of a functional group to the fluoro-resin of the inner layer (¶ [0023]).
- 17) Nishi teaches that “the adhesiveness-imparting functional group is a group having reactivity or polarity and may, for example, be a carboxyl group, a residue after dehydration condensation of a carboxyl group (a carboxylic anhydride residue), an epoxy group, a hydroxyl group, an isocyanate group, an ester group, an amide group, an acid amide group, an aldehyde group, an amino group, a hydrolyzable silyl group or a cyano group” (¶ [0028]).

#### ANALYSIS AND CONCLUSIONS

The Examiner relies on Nishino for a disclosure of the invention as claimed with the exception that Nishino fails to teach that the fluoro-resin of the inner layer has a functional group. The Examiner notes that Nishi

teaches that fluororesins have a low adhesive property and inadequate bond strength to most other materials, including polyamide and polyesters (Answer 4). The Examiner relies on Nishi's teaching that enhanced melt adhesiveness may be provided to fluororesins by incorporation of a functional group into the fluororesin (Answer 5). The Examiner concluded that:

[I]t would have been obvious to one having ordinary skill in the art at the time Appellant's [sic, Appellants'] invention was made to add a functional group selected from [sic, from] the group consisting of epoxy group, hydroxyl group, carboxylic anhydride residual group, and carboxylic acid group, in order to provide the fluororesin with increased adhesiveness to materials like polyester and polyamide, since adding a functional group to the fluororesin increases the adhesive bond between the fluororesin and the polyester and polyamide of the adhesive layer, as taught by Nishi. . . thus improving the adhesiveness between the fluororesin and adhesive layer of Nishino.

Answer 5-6.

Appellants argue that Nishi is directed to a hose having a two-layer structure comprising an inner layer made of a fluororesin and an adjacent outer layer made of polyamide (Br. 13). Appellants point out that Nishino relates to a hose having at least three layers, including an adhesive layer (Br. 13). Thus, Appellants maintain that Nishi and Nishino relate to different structures and to mutually exclusive solutions to the problem of interlaminar adhesion, such that neither reference discloses or suggests modification of the other reference (Reply Br. 6).

The teaching of a reference is not limited to the specific invention disclosed. *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1337 (Fed. Cir. 2006). Thus, the motivation to modify or combine references is not limited

to the reasons contemplated by the inventor. *See KSR Int'l Co. Teleflex, Inc.*, 127 S. Ct. 1727, 1732, 1741, 82 USPQ2d 1385, 1389, 1396 (2007) *quoting In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006)(“[A]nalysis [of whether the subject matter of a claim is obvious] need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.”). *See also In re Beattie*, 974 F.2d 1309, 1312, 24 USPQ2d 1040, 1042 (Fed.Cir.1992) (“As long as some motivation or suggestion to combine the references is provided by the prior art taken as a whole, the law does not require that the references be combined for the reasons contemplated by the inventor.”)

Although Nishi's invention is directed to a fuel hose which does not employ a separate, adhesive layer, the Examiner properly relied upon Nishi for a teaching that the bond between a layer of fluoro-resin and a layer of a polyamide and/or polyester may be improved by addition of a functional group to the fluoro-resin. Accordingly, we are in agreement with the Examiner's conclusion (Answer 8) that one of ordinary skill in the art, seeking to improve upon the adhesive bonding between Nishino's inner and middle layers, would have been motivated to add a functional group to the fluoro-resin of Nishino's inner layer as taught by Nishi to improve adhesion to the polyamide and polyester components of Nishino's adhesive layer. We find that the Examiner has established a prima facie case of obviousness which Appellants have failed to overcome.

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ORDER

The rejection of claims 1-8 under 35 U.S.C. § 103 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(i)(iv).

AFFIRMED

clj

Kratz, Quintos & Hanson, LLP  
1420 K Street, N.W.  
Suite 400  
Washington, DC 20005